

REMARKS

The Office Action mailed February 20, 2004 has been received and the Examiner's comments carefully reviewed. Claims 1-5 are currently pending. Applicants respectfully submit that the pending claims are in condition for allowance.

Specification Objections

The Examiner objected to the specification for an informality relating to the recited priority information. The priority information on page 1 has been amended as suggested by the Examiner. Applicants respectfully request withdrawal of this objection.

Rejections Under 35 U.S.C. §103

The Examiner rejected claims 1-5, under 35 U.S.C. §103(a) as being unpatentable over Cannon (U.S. Patent 5,339,777). Applicants respectfully traverse this rejection.

Cannon discloses an electro-hydraulic valve 100. The valve 100 includes a solenoid 102 having first and second coils 110, 112 that shift an armature 108, and thereby an interconnected spool 130, between a first position (FIG. 2) and a second position (FIG. 3). In the first position, the solenoid 102 is energized to open fluid communication between a control port 126 and a tank port 124 of the valve 100. In the second position, the solenoid 102 is energized to open fluid communication between the control port 126 and a pressure supply port 122.

Claim 1 recites a method of controlling fluid flow in a valve arrangement. The method includes pressurizing a work port by energizing a solenoid device and moving a spool a first distance from a neutral position to a pressurized position. The method further includes relieving the work port by de-energizing the solenoid device and moving the spool a second distance. In addition, the method includes moving the spool, without energizing the solenoid device, from the relieving position to the neutral position, the valve

arrangement being configured to provide a second gap for fluid communication between the work port and the tank port when the spool is in the neutral position.

I. Cannon does not teach or suggest a method of controlling fluid flow in a valve arrangement that includes pressurizing a work port by energizing a solenoid device and moving a spool a first distance from a neutral position to a pressurized position. Rather, Cannon teaches that the valve 100 is operated by moving the spool 130 from a first (relieving) position to a second (pressurized) position, not from a neutral position to a pressurized position.

Although the Examiner asserts that a neutral position is illustrated in FIG. 6, in fact, FIG. 6 illustrates the valve 100 in a failed condition; that is, the solenoid 102 has failed and the valve 100 became stuck in the pressurized position (FIG. 4). When the solenoid fails while in the pressurized position, the valve 100 is configured to such that a spike force, caused by a piston 214 striking an engine valve 214, is transmitted through the fluid to act upon a popper plug 138. The spike force causes the spool 130 and the popper plug 138 to move relative to one another so that the tank port 124 of the valve 100 opens to the control port 126 (FIG. 5). After such a failure, the springs bias the spool 130 to a neutral position, as shown in FIG. 6.

The failure mode shown in FIG. 6 is not an operating mode that can be used as a method of "controlling fluid flow in [the] valve." That is, from the failed neutral position of FIG. 6, the valve 100 cannot "pressuriz[e] the work port by energizing the solenoid device," as recited in claim 1, because in fact, the solenoid has failed. Further, because the solenoid has failed, the valve 100 also cannot move "the spool a first distance from a neutral position to a pressurized position," as recited in claim 1.

II. Cannon also does not teach or suggest relieving the work port by de-energizing the solenoid and moving the spool a second distance to a relieving position. Rather, Cannon teaches that to move the spool 130 to the first relieving position, the valve 100 must be actuated or energized (column 4, lines 1-5), not de-energized as recited in claim 1.

III. Cannon additionally does not teach or suggest a valve arrangement configured to provide a second gap for fluid communication between a work port and a tank port when a spool is in a neutral position. To make up for the deficiencies of Cannon, the Examiner asserts that it would have been obvious to one of ordinary skill in the art to provide a small gap between the work port and the tank port of Cannon in order to provide for relief of any leakage from the support port to the work port.

From Applicants' perspective, it appears the Examiner has used Applicants' own disclosure as a motivation to modify the valve 100 of Cannon. Applicants' specification discloses that the neutral gap 64 of the valve assembly is configured to accommodate a minimal flow rate to prevent unwanted build up of pressure in a brake line of a working unit 16. Page 8, lines 16-17. Applicants' specification further discloses that the neutral position in conventional designs is traditionally also the fully released position. Page 9, lines 10-11. Accordingly, no neutral gap is needed in conventional designs. Because no neutral gap is needed in conventional designs, Applicants respectfully submit that modifying Cannon to include a neutral gap in the valve 100 while at the failed neutral position can only be based upon hindsight reconstruction.

At least for these reasons, Applicants respectfully submit that independent claim 1, and dependent claims 2-5 are patentable.

SUMMARY

It is respectfully submitted that each of the presently pending claims (claims 1-5) is in condition for allowance and notification to that effect is requested. The Examiner is invited to contact Applicants' representative at the below-listed telephone number if it is believed that prosecution of this application may be assisted thereby.

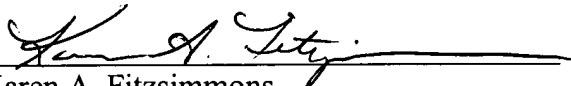
Although certain arguments regarding patentability are set forth herein, there may be other arguments and reasons why the claimed invention is patentably distinct. Applicants reserve the right to raise these arguments in the future.



Date: May 10, 2004

Respectfully submitted,

MERCHANT & GOULD P.C.
P.O. Box 2903
Minneapolis, Minnesota 55402-0903
(612) 332-5300


Karen A. Fitzsimmons
Reg. No. 50,470
KAF:cjm